PROPOSED TESTING REQUIREMENTS FOR THE DEMONSTRATION OF MOBILE PCB DESTRUCTION FACILITES

May, 1984

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Ministry
of the
Environment
Ontario

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EXECUTIVE SUMMARY

The Ministry of the Environment is developing proposals for the regulation of mobile PCB destruction facilities. Included in the proposals are the procedures to be followed by proponents to demonstrate that their facilities meet the proposed regulatory requirements. This document sets forth these testing procedures as they are to be applied to two classes of destruction technologies.

The information that must be submitted to the Ministry to support an application to carry out a demonstration test is specified. Conditions are also defined under which approvals of facilities may be granted without undergoing a demonstration test.

Operating requirements during the demonstration testing, including assembly and operation of facilities, operational controls, test duration, waste feed concentrations, supplementary fuel details and discharge of waste streams, are addressed.

Site selection requirements for location of facilities to be demonstrated are defined, as are requirements for process, emission and environmental monitoring. Sample and analytical collection methods are defined for the pre-destruction background, demonstration and post-destruction phases.

The details to be contained in the final report on the demonstration tests are specified and the responsibilities of the proponents and the Minstry are delineated.

1. Introduction

1.1 Background

The Ministry of the Environment is developing proposals for the regulation of mobile PCB destruction facilities.[1] These proposals will be the subject of a hearing under the Public Inquiries Act[2] following a period of consultation with the public. This hearing will allow for public input into the rules and procedures to be followed for operation and siting of mobile PCB destruction facilities in Ontario. The current public hearing requirements of Part V of the Environmental Protection Act[4] will not be applicable. The proposals consist of:

a) a specific regulation[3] under the Environmental Protection Act[4] which will set out the standards and criteria for siting and operation of facilities;

b) an amendment[3] to Regulation 293 of the Environmental Assessment Act[5] which will relieve proponents of the requirement to undertake an environmental assessment where public lands are proposed for the siting of a facility and/or a public sector client wishes a private sector operator of a facility to dispose of its PCB wastes;

c) details of testing procedures and results to be reported by proponents in order to demonstrate that their facilities can comply with Ministry standards, criteria and guidelines.

This document sets forth the demonstration testing procedures and reporting requirements referred to in (c) above.

1.2 Objectives

The specific objectives of this document are:

- to establish a set of consistent requirements to be applied to applicants requesting approval to operate mobile PCB destruction facilities in Ontario;

- to communicate these requirements to prospective proponents of such facilities;

- to submit the requirements for comment in the public consultation and hearing programs addressing the regulation of such facilities;

- to serve as a guide to the Ministry in assessing adequacy and completeness of applications for approval to operate mobile PCB destruction facilities;

- to inform the public of the level of scrutiny which these mobile technologies will be given by the Ministry to ensure protection of the environment and human health.

1.3 Terms of Reference

Two classes of mobile PCB destruction facilities are included in the regulatory proposals:

(a) Class 1 facilities handling and processing PCB wastes such that the PCB and associated organic matrix are destroyed by incineration or other thermo-chemical processes; and

(b) Class 2 facilities handling and processing PCB wastes such that the PCB is destroyed by chemical means and the associated organic matrix is recovered for reuse or disposal.

The regulatory proposals1) have been developed for application to any mobile PCB destruction facilities which may seek approval to operate in Ontario. Similarly the testing procedures detailed below are to be applied to any such facilities. Further testing details will depend on the specific technology incorporated in the facilities for which approval is being sought and will be established after an application to carry out a demonstration test has been received by the Ministry.

1.4 Compliance Requirements

To obtain approval to operate mobile PCB destruction facilities in Ontario, it must be demonstrated that the facilities can comply with the environmental standards, operational controls, monitoring and record keeping requirements set out in the Ministry's "Revised Proposals for the Regulation of Mobile PCB Destruction Facilities"1), as well as existing, applicable Ministry guidelines, standards and criteria4-8). The procedures specified herein are designed to enable a proponent to demonstrate compliance with these requirements.

2. Need for Demonstration

When a proponent applies for approval to operate mobile PCB destruction facilities, the Ministry must decide whether:

- sufficient reliable, technical data are available from the operation and/or testing of such facilities in another jurisdiction to establish to the Ministry's satisfaction the capability of the facilities to meet the Ministry's standards, guidelines and criteria without undergoing any additional tests;

- data available from the operation and/or testing of such facilities in another jurisdiction are sufficient to satisfy the Ministry that the facilities may have the potential to meet the Ministry's standards, guidelines and criteria, but some additional testing is required;

- sufficient reliable data from laboratory or bench scale studies of the proposal technologies are available to satisfy the Ministry that the proposed commercial scale facilities have the potential to meet the Ministry's standards, guidelines and criteria and that a demonstration test is warranted.

2.1 Approval of Facilities Without Demonstration

Approval of facilities without requiring a demonstration will be considered if and when a proponent can satisfy the Ministry that the proposed facilities can meet its criteria and proposed standards1). To support such an application for approval, the proponent must submit a report as stipulated in Section 6 of this document.

The report must contain results of tests of the proposed facilities of at least such duration as stipulated herein and any engineering, process and monitoring details needed, including point of impingement calculations[6)], to assure the Ministry that the facilities can consistently meet Ontario's environmental criteria and standards. The Ministry will determine the adequacy and reliability of the data submitted. Data must be submitted for the same design and capacity of facilities for which approval is being sought.

Based on the completeness and quality of the data submitted, the Ministry may:

- approve or refuse approval of the facility without further testing;

- require the collection of some additional data using methods and staff approved by the Ministry. These data may, upon prior agreement from the Ministry, be obtained where such facilities are currently located even if outside of Ontario.

- require comprehensive demonstration tests to be performed in accordance with the stipulations in this document and any operational requirements appropriate to the specific technology being tested.

2.2 Approval of a Demonstration

To obtain approval to carry out demonstration tests of commercial scale facilities, reliable test data must be submitted based on either:

- operating results of the commercial facilities approved for operation within another jurisdiction; and/or

- testing results of pilot or bench scale facilities.

The data submitted must satisfy the Ministry that the demonstration test can be carried out in accordance with the precautions stipulated in this document and that the facilities have the potential to meet the proposed Ministry criteria and standards1) for mobile PCB destruction facilities. Details of the proposed demonstration testing and analytical procedures and of the nature, quantity and flow rate(s) of PCB waste to be tested must be submitted in the request for agreement to demonstrate facilities. The request must contain but not be limited to, the following details:

- process and design details of bench or pilot scale facilities previously tested, as well as of the proposed commercial scale facility to be tested;

- test results of pilot or bench scale facilities previously tested or of commercial facilities operated elsewhere, establishing successful destruction of PCBs without generating emissions of any other pollutants exceeding Ministry regulations, criteria and guidelines[3,4,6,7,8]. Such results should include PCB content in materials processed and resulting byproducts from the process;

- sampling and analytical methods used to obtain test results;

- proposed testing protocol for the demonstration including materials handling procedures; nature and quantity of PCB wastes to be destroyed; duration of proposed tests; emission streams to be monitored and analytical methods; proposed process monitoring and automatic shutdown features; proposed method of calculating overall process material balance; nature and quantity of supplementary fuels and other reaction chemicals, (for example, scrubbing solutions), proposed method(s) of disposal of liquid and/or solid effluents.

- expected emissions and point of impingement calculations for anticipated air emissions demonstrating compliance with Regulation 308 and any air criteria and guidelines of the Ministry.

- location of proposed demonstration site and site characteristics.

- qualifications of staff supervising the demonstration.

3. Operating Requirements

3.1 Assembly and Operation of Facilities

To satisfy the Ministry that the facilities are to be operated and supervised by trained and qualified staff, the names and qualifications of staff shall be included in the request for authorization of a demonstration.

The proponent shall demonstrate to the satisfaction of the Ministry that the facilities are mobile and can be operated within the time constraints specified in the proposed regulation3).

Prior to the start-up of the testing unit, the system shall be inspected by Ministry staff and operating personnel for the integrity of the various components. All pipe joints, valve and pump glands must be free of leaks and all flexible hoses in good condition.

3.2 Operational Controls

During the demonstration period, the facilities shall be operated in accordance with Section V of the Ministry's "Revised Proposals for the Regulation of Mobile PCB Destruction Facilities"1), which addresses waste storage and handling, transportation, contingency planning, security and occupational health and safety requirements.

No waste may be introduced to the facilities until the operating conditions necessary for the destruction of PCBs have been attained.

3.3 Test Duration

The facilities shall be operated under conditions necessary to destroy PCBs for a period sufficient to obtain the required samples for analysis.

In the case of continuously operated processes, the facilities must be operated a minimum of 6 to 8 hours under these conditions to obtain one complete set of samples of all streams to be monitored. Collection of 1 such set of samples will be considered one complete test. A minimum of 3 such tests must be carried out to ensure the reliability of the operation and of the analytical results for each different PCB waste to be destroyed.

In the case of batch processes, a minimum of 3 batches for each different PCB waste to be treated is required. One complete set of samples of all streams to be analyzed must be collected during each batch test.

Under no circumstances will the facilities be permitted to operate at a site for purposes of demonstration testing for more than 720 hours (30 days).

3.4 Waste Feed Concentrations

The facilities shall be tested at the maximum concentration and feed rate for which approval is being sought.

When the facilities to be tested have neither been operated nor demonstrated previously in another jurisdiction, the Ministry may also require that a range of concentrations of up to 3 waste feed streams be tested, ranging from PCB free to the maximum concentration of PCB in the waste for which approval to treat is being sought. In such cases, results from testing of lower concentrations of PCB wastes must be approved by the Ministry before the testing of the next higher concentration may begin.

3.5 Supplementary Fuel Composition

If supplementary fuel is required for operation of the facilities a detailed chemical analysis shall be submitted with the application. Any material found in the fuel which may result in contaminant emissions must be sampled for during the demonstration and included in the analyses. The use of waste solvent as a supplementary fuel is not permitted.

3.6 Discharge of Waste Streams

All liquid and solid products formed during the destruction tests shall be retained until sample analyses have been obtained and the Ministry has authorized discharge or disposal of the products.

4.0 Site Selection

4.1 Distance from Receptors

To address public concerns and fire protection needs[9] a minimum separation distance between facilities to be tested and certain receptors is required. Lands suitable for industrial operations, waste disposal or sewage treatment are recommended for consideration as potential demonstration sites.

For the demonstration tests, Class 1 facilities and associated equipment and storage containers must be located at least 500 meters from occupied public buildings, residences, schools, hospitals, nursing homes and establishments involved in food processing. After the facilities have successfully demonstrated that they can meet Ministry Standards, guidelines and criteria, they may be operated in accordance with the separation distances specified in the proposed regulation for mobile PCB destruction facilities[3].

For Class 2 facilities, facilities and associated equipment and storage containers must be at least 100 meters from occupied public buildings, residences, schools, hospitals, nursing homes and establishments involved in food processing and public buildings.

4.2 Public Notification

After receiving authorization for a demonstration from the Ministry, the proponent shall notify the City Clerk of the local municipal administration in which the demonstration is to take place. Such notification shall include the time, location and duration of scheduled testing and shall occur at least 30 days prior to commencement of testing.

4.3 Local Municipal Approvals

The proponent shall obtain any required local municipal approvals.

4.4 Site Features

The terrain of the site on which facilities are to be tested shall be level and well graded. Surficial characteristics must impede migration of spills. Surface materials of sites must allow for prompt and effective clean up of spills. Prevention of migration of spills into groundwater is of prime importance when considering the suitability of surficial characteristics of potential test sites. In the event that sites do not have these characteristics alternative measures acceptable to the Ministry may be used to prevent migration of spills into groundwater.

Facilities and associated equipment and storage containers shall be at least 100 meters from a watercourse or drainage system or be capable of being isolated from them by temporary impoundments and blockage of drains and ditches.

4.5 Site Preparation and Restoration

The proponent shall be responsible for ensuring that appropriate services, such as electricity and water supply for carrying out the demonstration are available. The proponent shall be responsible for preparation of the site and for site restoration after disassembly of facilities. The site shall be prepared and subsequently restored to the satisfaction of the Ministry.

4.6 Performance Bond

Proponents shall post a performance bond of $50,000 to ensure that funds are available for site restoration. Where in the Ministry's opinion it is necessary to have a larger bond posted, a condition will be added to the agreement to carry out the demonstration test. The Ministry or an authorized contractor will inspect the site within 7 days of disassembly and removal of facility and, due to the length of time required for analysis, will report on this inspection within 45 days. If no remedial measures are required, the Ministry will relinquish any claims on the performance bond.

5.0 Monitoring Requirements

Detailed process, emissions, and environmental monitoring will be required during demonstration tests. Results from the detailed emission and process monitoring will be used to establish the conditions, such as the maximum waste feed rate ranges, operating temperatures, etc., within which the facility may be approved to operate.

Operation of facilities after approval by the Ministry, will be controlled using continuous monitoring of process parameters integrated with automatic waste feed shut down controls1).

Any excursions above the Ministry air pollution guidelines10) detected during the test will result in an order for immediate shutdown of testing until the reason for excess emissions has been determined and the problem corrected (see Section 5.2).

5.1 Process Monitoring

Each different destruction technology will have a different set of parameters that are critical to the control of the destruction process and to the prevention of unacceptable environmental emissions. In incineration, for example, such parameters would include but not be limited to, combustion temperature, oxygen concentration, carbon monoxide concentration, carbon dioxide concentration, total hydrocarbon concentration, and flow of neutralizing liquid to the scrubber.

Prior to commencement of testing, the proponent shall submit a process description, complete with critical process parameters that are to be continuously monitored (see Section 2.2). These parameters, which must be reviewed and approved by the Ministry prior to commencement of testing, must be continuously monitored in conjunction with emissions to the environment. The ranges of the parameters within which acceptable emissions are achieved are to be established and/or confirmed during testing. Any excursion outside of these ranges shall result in an immediate and automatic shutdown of the waste feed-stream until the conditions resulting in the process upset have been corrected.

5.2 Environmental and Emission Monitoring

The environmental and emissions monitoring requirements are designed to ensure that sufficient data are available to determine significant environmental effects while limiting the considerable burden of collecting and analyzing samples. Hence, provision is made for waiving analyses of certain samples provided certain conditions are met as detailed below.

5.2.1 Class 1 Facilities

5.2.1.1 PCB Pre-Destruction Background Monitoring

To detect any effect of PCB destruction on the local environment, where applicable, samples of the soil, vegetation, water and ambient air must be collected at the demonstration site and evaluated for PCB and chlorobenzene content. Additional samples must be collected and held for subsequent analyses for polychlorinated dibenzo-p-dioxins (PCDD), polychlorinated dibenzofurans (PCDF), chlorophenols, hydrogen chloride, chloride, sulphur oxides and trace metals as may be deemed necessary by the Ministry of Environment. A list of references to the recommended sampling procedures are in Appendix I. Equivalent sampling methodologies to those in Appendix I may be employed subject to prior approval from the Ministry of Environment. Table 5.2.1 summarizes the required pre-destruction background testing.

TABLE 5.2.1

PCB PRE-DESTRUCTION BACKGROUND EVALUATION*

Sample type	No. of Samples	Sampling Method	Substances to be Analyzed
1A. Ambient Air	4-one at each compass point, at points of impingement.	Florisil absorption cartridge.	PCB, chlorobenzenes.
1B. Ambient Air	Same as above	Hi-Vol filtration with sorbent cartridge; filter and cartridge to be analyzed separately; continuous analyzers and/or impinger trains	PCDD, PCDF, Chlorophenols, $S0_x$, HCl & Cl_2, NOx, total hydrocarbon.
2A. Soil	4-at or near location of ambient air samples	grab samples-take 6 grabs at each location and composite	PCB, Chlorobenzenes.
2B. Soil	Same as above	Same as 2A	PCDD, PCDF, Chlorophenols, total chlorine, total sulphur, trace metals.
3A. Vegetation	Same as 2A-only take if location warrants	grab samples	PCB, Chlorobenzenes.
3B. Vegetation	Same as 3A	grab samples	total chlorine, total sulphur, trace metals contents.
4A. Water	4-take if location warrants	grab samples	PCB, Chlorobenzenes.

TABLE 5.2.1
(Continued)

Sample type	No. of Samples	Sampling Method	Substances to be Analyzed
4B. Water	Same as 4A	Same as 4A	PCDD, PCDF, chlorophenols, sulphur and chlorine contents, trace metals.

* "A" type samples must be taken and analyzed

"B" type samples must be taken as historical samples - only analyzed if required on the basis of "A" type sample results.

NOTE: Where grab samples are taken, enough sample should be obtained to perform at least 3 determinations for each substance to be tested.

These are recommended minimum numbers of background samples to be collected. Depending upon the specific technology to be demonstrated and the selected site, additional samples may be required. All background samples must be collected within one week prior to commencement of the PCB destruction demonstration testing.

5.2.1.2 PCB Destruction Demonstration Environmental Emission Monitoring

All discharges to air, water and soil as well as process streams must be monitored during the PCB destruction demonstration testing. Liquid and solid effluents shall be contained until analytical results demonstrate that they may be safely discharged in compliance with Ministry guidelines and legislation$^{2,3,4,7,8)}$. Specific substances to be monitored will depend upon the specific destruction method being tested. PCBs and chlorobenzenes must always be monitored. Other substances, such as PCDD's, PCDF's, and chlorophenols must also be measured because they may be present in the waste feedstream or may be formed during the PCB destruction process. Table 5.2.2 is the list of sample streams with corresponding pollutants to be monitored. Additions or deletions of sample types/numbers may be required, depending upon the specific PCB destruction technology and location of the demonstration site.

TABLE 5.2.2

SAMPLES ANALYZED DURING PCB DESTRUCTION TESTING

Sample Type	No. of Samples Required	Sampling Method	Substances to be Analyzed
1A.Feed	Take 1 sample at 1/2 hour interval during sampling period combine to give composite sample over the sampling period. For analyses one sample per demonstration test. 3 tests to be carried out.	grab sample	PCB, chlorobenzenes, trace metals, chlorine and sulphur content, PCDD, PCDF, Chlorophenols, carbon content
2. Water Influent	Same as 1A	Same as 1A	PCB, chlorobenzenes
3. Supplemental Fuel	Same as 1A	Same as 1A	PCB, chlorobenzenes, trace metals, chlorine and sulphur contents, PCDD, PCDF, chlorophenols
4. Reagents for Batch Process	Same as 1A	Same as 1A	PCB, chlorobenzenes, trace metals, chlorine and sulphur contents, PCDD, PCDF, chlorophenols

TABLE 5.2.2

(Continued)

SAMPLES ANALYZED DURING PCB DESTRUCTION TESTING

Sample Type	No. of Samples Required	Sampling Method	Substances to be Analyzed
5A. Stack Emissions	Two samples per test, three tests per PCB waste concentration	method 5 train, modified to include two florisil traps. Particulate catch and vapor components (impingers & florisil) to be analyzed separately	PCB, Chlorobenzenes, chlorophenols
5B. Stack Emissions	Same as 5A	Same as 5A - separate train required	PCDD, PCDF
5C. Stack Emissions	One sample per test, 3 tests per waste PCB concentration	method 5 train with 5% HNO_3, as impinger solution	Particulates, trace metals
5D. Stack Emissions	as per 5C	method 5 train, Texas method	HCl, Cl_2
5E. Stack Emissions	continuous monitoring	continuous analyzers	THC, O_2, CO, CO_2 NO_x, SO_2
6. Liquid Effluent	Same as 1A	same as 1A; particulates in water to be filtered and analyzed separately.	PCB, chlorobenezenes, total chlorine, total sulphur, PCDD, PCDF, chlorophenols

TABLE 5.2.2

(Continued)

Sample Type	No. of Samples Required	Sampling Method	Substances to be Analyzed
7. Ash/Sludge Residue	one sample per 1/2 hour composite over test period, one sample per test, 3 tests	Composite grab sample from different locations as appropriate	PCB, chlorobenzenes, chlorophenols, trace metals, total chlorine, total sulphur, PCDD, PCDF
8A. Ambient Air Monitor	8-from in same locations as during pre-test, at points of impingement-four at property line locations	Florisil adsorption cartridge, Hi-Vol filters and impinger trains	PCB, Chlorobenzenes, trace metals, HCl, Cl_2, PCDD, PCDF, Chlorophenols
8B. Ambient Air Continuous Monitor	Continuous during test: locations depend upon wind direction	TAGA (a)	PCB

NOTE: Monitoring of trace metals sulphur oxides and sulphur contents are requirements only if present in feed and/or supplemental fuel and/or reagents.

Where grab samples are taken, enough sample should be obtained if possible, to perform at least 3 determinations for each substance to be tested.

a) TAGA = Trace Atmospheric Gas Analyzer[11, 12] to be made available by the Ministry under certain conditions (see Section 7).

5.2.1.3 Post-Test Monitoring

This consists of the samples described in Table 5.2.1, and must be taken within 48 hours after the completion of a destruction demonstration. Analysis of post-test soil samples for PCB, chlorobenzenes, and total chlorine must be performed. Analysis of other samples listed in Table 5.2.1 depends upon results of the destruction demonstration monitoring.

5.2.1.4 Monitoring for Process Shutdown

A destruction demonstration shall be terminated if ambient levels of 450 ng/m^3 of PCB per 1/2 hour average are detected, based on analysis by TAGA[11,12].

Testing will also be terminated if specified destruction process parameters cannot be maintained within specified ranges. Definitions of excessive fluctuations in process parameters will depend upon specific technologies. These definitions will be conditions of approval to operate.

5.2.1.5 Replications

Three replicate tests must be conducted at each of the feed rates and PCB waste concentrations to be tested.

5.2.1.6 Analytical Methods

A list of references of the recommended analytical procedures for the various samples collected in

Tables 5.2.1 and 5.2.2 is shown in Appendix II. Modifications to these procedures or equivalent techniques may only be used, with prior approval from the Ministry of Environment. Complete documentation of methods and modifications must be submitted with the final report (see Section 6).

5.2.2 Class 2 Facilities

5.2.2.1 PCB Pre-Destruction Background Evaluation

The same procedure shall be followed as outlined in Section 5.2.1.1, except that analyses for hydrochloric acid, chlorine, sulphur and nitrogen oxides are not mandatory.

5.2.2.2 PCB Destruction Demonstration Environmental and Emission Monitoring

All emissions to air, water and soil are to be monitored. Liquid and solid products shall be contained for discharge until analytical results demonstrate compliance with Ministry legislation guidelines as contained in the Environmental Protection Act3), the Revised Proposals for the Regulation of mobile PCB Destruction Facility1), the Ontario Water Resources Act7) and the Ministry's Water Management Goals, Policies, Objectives and Implementation Procedures.8) The sampling and analytical methods shall be as specified in Section 5.2.1.2. The sample collection methods will depend upon the design flow and potential quantity and nature of emissions.

Depending on the technologies employed, the Trace Atmospheric Gas Analyzer[11,12)] may not be required for Class 2 facilities. For samples of ambient air, the methods outlined in Table 5.2.1, 1A and 1B are to be followed.

5.2.2.3 Post-Test Monitoring

See 5.2.1.3, except that analyses for hydrochloric acid, chlorine, sulphur and nitrogen oxides are not required.

5.2.2.4 Replications

See Section 5.2.1.5.

5.2.2.5 Analytical Methods

See Section 5.2.1.6.

6. Report Requirements

A report documenting the quantity and nature of wastes tested, testing procedures, analytical methods and results for predestruction, demonstrating and post-test monitoring shall be submitted to the Ministry. Complete documentation of methods and modifications must be submitted. It is essential to demonstrate, using a material balance of incoming and exit streams that the PCBs are actually being destroyed in the test facilities, without creation of other pollutants that exceed Ministry standards and guidelines3,4,6,7,8,10).

The report shall address, as a minimum, the subjects indicated in the following headings:

Objectives

Process Description

- Facility Design Details

Methods

- sample collection procedures
- numbers of samples collected
- analytical procedures
- detection limits
- duration of test periods
- nature and quantity of wastes treated

Results

- process monitoring
- environmental monitoring
- emissions monitoring
- Material Balance of incoming and exit streams
- Comparison of results with regulatory standards

Conditions for which approval is sought.

- waste flow rates and PCB concentrations
- process parameter shutdown conditions

Conclusions

7. Responsibilities

The proponent shall be responsible for:

(i) all expenses incurred in preparing applications for approval of demonstration and for approval of facilities;

(ii) site preparation and site restoration;

(iii) location and operation of facilities at demonstration site;

(iv) all process and emission monitoring;

(v) analysis of process and emission tests;

(vi) preparation of final report;

(vii) obtaining all local municipal approvals.

To facilitate the implementation of mobile PCB destruction facilities in Ontario, the Ministry will consider assuming the responsibility for collection and analysis of environmental monitoring samples until a number of such facilities have been successfully established.

Ministry staff will be present when facilities are being tested and will witness testing procedures. The senior Ministry official present at the demonstration site will be authorized to order shutdown of testing as a condition of Ministry agreement to conduct the demonstration.

8. References

1. Revised Proposals for the Regulation of Mobile PCB Destruction Facilities, Ministry of the Environment, May 1984.

2. Public Inquiries Act - Revised Statutes of Ontario, 1980, chapter 411.

3. Proposed Ontario Regulation under the Environmental Protection Act, Mobile PCB Destruction Facilities and Proposed Regulation to Amend Regulation 293 of Revised Regulations of Ontario, 1980 made under the Environmental Assessment Act.

4. Environmental Protection Act - Revised Statutes of Ontario, 1980, Chapter 141.

5. Environmental Assessment Act - Revised Statutes of Ontario, 1980, Chapter 140.

6. Regulation 308, Revised Regulation of Ontario, 1980.

7. Ontario Water Resources Act - Revised Statutes of Ontario, 1980, Chapter 361, amended in 1981, July, 1983.

8. Water Management Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment, November, 1978.

9. Fire Marshall's Act, RSO 1980, Chapter 166, Section 18(4).

10. List of Tentative Standards, Guidelines and Provisional Guidelines for Air Contaminants, January 1983, Ontario Ministry of the Environment.

11. TAGA 6000 MS/MS, A High Performance Mass Spectrometer System, SCIEX.

12. Flash Chromatography MS/MS - A Highly Sensitive Technique for the Rapid Screening of Complex Matrices for Trace Contaminants - A Preliminary Report, SCIEX.

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APPENDIX 1

RECOMMENDED SAMPLE COLLECTION METHODS

Procedures contained in this appendix are suggested methods. Alternate equivalent methods may be used with prior approval from the Ministry.

The reference procedure for sulphur dioxide is a manual wet chemical method. A continuous analyzer may be used. The type of analyzer and sample conditioning system proposed are to be approved by the Ministry.

1. Ontario Ministry of the Environment, Source Testing Code, (Version #2), A Report #ARB-TDA-66-80 Nov. 1980.

2. Ontario Ministry of the Environment, Field Investigation Manual, Phytotoxicology Section, Air Resources Branch, ARB-68-83-Phyto, April 1983.

3. Ontario Ministry of the Environment, Method for the Determination of Organochlorine Pesticides and Polychlorinated Biphenyls, Method Manual.

4. Ontario Ministry of the Environment, Method for the Determination of Polychlorinated Biphenyls in Oils, Method Manual.

5. Ontario Ministry of the Environment, A Guide to the Collection and Submission of Samples.

6. For Laboratory Analysis, Method Manual, April 1984 Version.

7. Ontario Ministry of the Environment, Method for Sampling and Analysis of Polychlorinated Biphenyls in Ambient Air, Air Resources Branch, Report AMP-137, Jan. 1984.

8. Ontario Ministry of the Environment, Method for Sampling for Trace Organic Contaminants, Air Resources Branch.

9. Ontario Ministry of the Environment, Ontario Source Testing Code Sulphur Dioxide, Air Management Branch, Jan. 1973.

10. Ontario Ministry of the Environment, Guidelines on Continuous Total Hydrocarbon Analysis of Point Source Emissions, Air Resources Branch.

11. Texas State Department of Health Air Pollution Control Services, Compliance Sampling Manual, Revised March, 1973.

APPENDIX II

RECOMMENDED ANALYTICAL METHODS

1. Ontario Ministry of the Environment, Method for the Determination of Organochlorine Pesticides and Polychlorinated Biphenyls, Method Manual.

2. Ontario Ministry of the Environment, Method for the Determination of Polychlorinated Biphenyls in Oils, Method Manual.

3. Ontario Ministry of the Environment, Method for the Sampling for Trace Organic Contaminants in Incineration Emissions, Air Resources Branch.

4. Ontario Ministry of the Environment, Method for Sampling and Analysis of Polychlorinated Biphenyls in Ambient Air, Air Resources Branch, Report AMP-137, Jan. 1984.

5. Ontario Ministry of the Environment, Method for Sampling Sulphur Dioxide in Incinerator Emissions, Air Resources Branch, Jan. 1983.

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